IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of: Heideman et al.	)	Attorney Docket No. 080743165002
Serial No.: 09/693,803	)	
Filed: October 20, 2000	)	
For: INTEGRATED OPTICAL LIGHTGUIDE DEVICE	)	
Examiner: Kang, Juliana K.	)	
Group Art Unit: 2874	)	
Confirmation No.: 8677	)	

AMENDMENTS TO THE CLAIMS

Claims 1-13, 16-19, 21-23, 25, 32, 38 and 43 (Cancelled)

Claim 14 (Previously Presented) A method for varying the output power of an integrated optical lightguide device comprising the steps of:

providing a lightguide device;

locating a light source at an entrance of said lightguide device;

locating a light detector at an exit of said lightguide device;

transmitting light through said lightguide device in a direction of light propagation;

forming in a non-periodic or arbitrary length distribution different types of segments in said lightguide device, each type of segment having a different refractive index profile in a plane perpendicular to said direction of light propagation wherein the refractive index profile of at least one type of segment is sensitive to an external physical parameter or chemical compound activating said at least one type of segment;

using refractive index profile dependent attenuation of guided modes passing transitions between two different segments; and

providing a lightguide channel including a light transmitting layer of an electro-optical material, wherein, in order to obtain light modulation, activating segments of one type by means of an electrical potential difference between two electrodes patterned in an electrically conductive intermediate layer on either side of said lightguide channel.

Claim 15 (Previously Presented) A method for varying the output power of an integrated optical lightguide device comprising the steps of:

providing a lightguide device;

locating a light source at an entrance of said lightguide device;

locating a light detector at an exit of said lightguide device;

transmitting light through said lightguide device in a direction of light propagation;

forming in a non-periodic or arbitrary length distribution different types of segments in said lightguide device, each type of segment having a different refractive index profile in a plane perpendicular to said direction of light propagation wherein the refractive index profile of at least one type of segment is sensitive to an external physical parameter or chemical compound activating said at least one type of segment;

using refractive index profile dependent attenuation of guided modes passing transitions between two different segments; and

wherein use is made of light transmitting layer comprising a thermo-optical material and wherein activating segments of one type by means of an electrical current driven through an electrical conducting intermediate layer introducing a segment pattern corresponding

with a predetermined pattern of segments activated by an external physical parameter or chemical compound.

Claim 20 (Previously Presented) A method for determining a physical or chemical parameter using an integrated optical lightguide device comprising the steps of:

providing a lightguide device;

locating a light source at an entrance of said lightguide device;

locating a light detector at an exit of said lightguide device;

transmitting light through said lightguide device in a direction of light propagation;

forming in a non-periodic or arbitrary length distribution several types of segments in said lightguide device, each type of segment having a different refractive index profile in a plane perpendicular to the direction of light propagation wherein the refractive index profile of at least one type of segment is sensitive to an external physical parameter or chemical compound activating said at least one type of segment;

using refractive index profile dependent attenuation of guided modes passing transitions between two different segments;

measuring an amount of light entering said lightguide device in the form of one or more guided modes;

measuring an amount of light leaving the lightguide device in the form of guided modes; and

determining a ratio between the amount of light entering said lightguide device and the amount of light leaving said lightguide device, wherein said lightguide device comprises two types of segments S_1 and S_2, wherein S_1 is activated by a quantity A and S_2 is activated by a

quantity B different from A and wherein S_1 and S_2 are incorporated in a feedback circuit and wherein, based on a constant transmission by the lightguide device, a relationship of a refractive index profile of S_2 to that of a refractive index profile of S_1 is maintained by applying a suitable value B, from which the quantity A is deduced.

Claim 24 (Previously Presented) An optical lightguide device comprising:

a light source at an entrance side;

a light detector at an exit side;

an integrated optical lightguide device wherein a light transmitting layer comprises an electro optical material in which an electric potential difference is applied between a first electrically conductive layer deposited on a first side of said electro optical material and a second electrically conducting layer deposited on an opposite side of said electro optical material wherein an electrode pattern is formed; and

a series of two types of segments spaced in a non-periodic manner along a direction of light propagation, which non-periodic manner is determined by the electrode pattern wherein one type of segment shows a refractive index distribution in a plane perpendicular to the direction of light propagation which is a function of said applied electrical potential difference.

Claim 26 (Currently Amended) An integrated optical device comprising:

a first structure extending along a ~~said~~ light path, said first structure having light transmitting properties at a first refractive index distribution in a plane perpendicular to the direction of light propagation;

a second structure extending along the ~~said~~ light path and in optical communication with said first structure, said second structure having light transmitting properties at a second refractive index distribution in a plane perpendicular to the direction of light

propagation, said second refractive index distribution being different from said first refractive index distribution; and

a third structure extending along the ~~said~~ light path and in optical communication with said second structure, said third structure having at least a plurality of first and second segments, each segment of said plurality of first segments having a refractive index distribution in a plane perpendicular to the direction of light propagation which is different from a refractive index distribution in a plane perpendicular to the direction of light propagation of each of said segments of said plurality of second segments, and each segment of said plurality of first segments being generally of unequal length compared to other segments of said plurality of first segments in the direction of said light path wherein a change in the amount of light transmitted by said integrated optical device is a function of a parameter being sensed.

Claim 27 (Previously Presented) The device of claim 26 wherein:

the lengths of said segments of said plurality of first segments are formed arbitrarily.

Claim 28 (Previously Presented) The device claim 26 wherein:

said segments of said plurality of first segments are unevenly distributed.

Claim 29 (Previously Presented) The device of claim 26 wherein:

said segments of said plurality of first segments have depths which are generally unequal.

Claim 30 (Previously Presented) The device of claim 26 wherein:

said change in the amount of light is generally independent of wavelength.

Claim 31 (Previously Presented) The device of claim 26 wherein:

said segments of said plurality of first segments have various geometric shapes.

Claim 33 (Previously Presented) An integrated optical lightguide comprising:

a first light transmitting structure;

a second light transmitting structure, said second light transmitting structure consisting only of a strip of a material sensitive to a physical parameter or a concentration of a chemical compound, said strip having been formed into alternating non-periodic first and second segments by desensitizing said second segments.

Claim 34 (Previously Presented) An integrated optical lightguide comprising:

a first light transmitting structure;

a second light transmitting structure having a ridge in optical communication with said first light transmitting structure, said ridge of said second light transmitting structure having a series of alternating non-periodic segments of sensitive material and desensitized material.

Claim 35 (Previously Presented) An integrated optical device comprising:

a first light transmitting structure;

a second light transmitting structure having segments of alternating active material and non-sensitive material, wherein initially both sensitive and non-sensitive material segments have different refractive index profiles and when a sensed parameter obtains a predetermined value the refractive index distribution of said segments of sensitive material has changed to such a value that it generally matches the refractive index distribution of said segments of non-sensitive material.

Claim 36 (Previously Presented) An integrated optical device comprising:

a first light transmitting structure; and

a second light transmitting structure having alternating segments S_1 and S_2 wherein changes to the refractive index distribution of said segments S_1 are caused by a change

in one parameter from a first group of parameters consisting of a magnetic field, temperature, a force and a chemical concentration, and changes to the refractive index distribution of said segments S_2 is caused by a change in one parameter from a second group of parameters consisting of temperature, a magnetic field, an electric field and a force provided that the parameter of said second group is not the parameter of said first group that caused the change in refractive index distribution of said segments S_1.

Claims 37 (Previously Presented) A method for measuring an external physical parameter or a concentration of a chemical compound by measuring both input and output power of an integrated optical lightguide comprising the steps of:

providing a lightguide;

transmitting light through said lightguide in a direction of light propagation; and

forming in a non-periodic distribution in the direction of the light propagation different types of segments, each type of segment having a different refractive index profile in a plane perpendicular to said direction of light propagation, with one type of segment being sensitive to said external physical parameter or said concentration of a chemical compound.

Claim 39 (Previously Presented) A method for measuring an external physical parameter or a concentration of a chemical compound by measuring both input and output power of an integrated optical lightguide comprising the steps of:

providing a lightguide;

transmitting light through said lightguide in a direction of light propagation;

forming in the direction of light propagation a ridge-type light channel of a material sensitive to said physical parameter or to said concentration of a chemical compound; and

desensitizing a series of spaced apart segments of said material to form a ridge of alternating non-periodic sensitive and desensitized segments.

Claim 40 (Previously Presented) A method for measuring an external physical parameter or a concentration of a chemical compound by measuring both input and output power of an integrated optical lightguide comprising the steps of:

providing a lightguide;

transmitting light through said lightguide in a direction of light propagation;

forming in the direction of light propagation a cladding layer of material sensitive to said physical parameter or to said concentration of a chemical compound; and

desensitizing a series of spaced apart segments of said cladding layer material to form a series of alternating non-periodic sensitive and desensitized segments.

Claim 41 (Previously Presented) A method for measuring an external physical parameter or a concentration of a chemical compound by measuring both input and output power of an integrated optical lightguide comprising the steps of:

providing a lightguide;

transmitting light through said lightguide in a direction of light propagation;

forming in the direction of light propagation a strip loaded light channel, said strip formed of material sensitive to said physical parameter or to said concentration of a chemical compound; and

desensitizing a series of spaced apart segments of said strip to form a series of non-periodic alternating sensitive and desensitized segments.

Claim 42 (Previously Presented) A method for measuring an external physical parameter or a concentration of a chemical compound by measuring both input and output power of an integrated optical lightguide comprising the steps of:

providing a lightguide;

transmitting light through said lightguide in a direction of light propagation;

forming in a direction of light propagation two types of segments S_1 and S_2 wherein S_1 is sensitive to a quantity A and S_2 is activated by a quantity B different from A and wherein S_1 and S_2 are part of a feedback circuit; and

activating S_2 in response to changes in the refractive index profile of S_1, which changes are a function of the presence of A, to maintain a constant transmission by the lightguide.

Claim 44 (Previously Presented) A method varying the output power of an integrated optical lightguide comprising the steps of:

providing a lightguide;

transmitting light through said lightguide in a direction of light propagation;

forming in the direction of light propagation a ridge-type light channel of a material sensitive to a physical parameter or to a concentration of a chemical compound; and

desensitizing a series of spaced apart segments of said material to form a non-periodic ridge of alternating sensitive and de-sensitized segments.

Claim 45 (Previously Presented) A method varying the output power of an integrated optical lightguide comprising the steps of:

providing a lightguide;

transmitting light through said lightguide in a direction of light propagation;

forming in the direction of light propagation a cladding layer of material sensitive to a physical parameter or to a concentration of a chemical compound; and

desensitizing a series of spaced apart segments of said cladding layer material to form a series of alternating non-periodic sensitive and desensitized segments.

Claim 46 (Previously Presented) A method varying the output power of an integrated optical lightguide comprising the steps of:

providing a lightguide;

transmitting light through said lightguide in a direction of light propagation;

forming in the direction of light propagation a strip loaded light channel, said channel formed of material sensitive to a physical parameter or to a concentration of a chemical compound; and

desensitizing a series of spaced apart segments of said channel to form a series of alternating non-periodic sensitive and desensitized segments.

Claim 47 (Previously Presented) A method for measuring a physical parameter or a concentration of a chemical compound A using an integrated optical lightguide comprising the steps of:

providing a lightguide;

transmitting light through said lightguide in a direction of light propagation;

forming in a direction of light propagation two types of segments S_1 and S_2 wherein S_1 is sensitive to a quantity A and S_2 is activated by a quantity B different from A and wherein S_1 and S_2 are part of a feedback circuit; and

activating S_2 in response to changes in the refractive index profile of S_1, which changes are a function of the presence of A, to maintain a constant transmission by the lightguide.

Claim 48 (Previously Presented) An integrate optical lightguide comprising:

a light transmitting layer of electro-optical material;

a first electrically conductive layer to one side of said light transmitting layer; and

a second electrically conductive layer to an opposite side of said light transmitting layer, said second electrically conductive layer having a pattern such that application of a voltage creates an alternating segmentation, the alternating segmentation having a non-periodic distribution whereby the value of an applied voltage determines the refractive index profile of selective segments.